perception of these explosions;—and lastly, that the hearing will be strongly affected by introducing into the ears two probes, the opposite extremities of which are connected with the two ends of the apparatus. No effect has as yet been produced upon the sense of smell by this machine, which is ascribed to the circumstance of the electric effluvia not being expanded in and conveyed by the air, which it is thought is the proper vehicle for exciting sensations in the olfactory nerves.

At the close of the paper the author points out the striking analogy there is between this apparatus and the electric organs of the torpedo and electric eel, which are known to consist of membranaceous columns filled from one end to the other with a great number of laminæ or pellicles, floating in some liquid which flows into and fills the cavity. These laminæ cannot be supposed to be excited by friction, nor are they likely to be of an insulating nature; and hence these organs cannot be compared either to the Leyden phial, the electrophore, the condenser, or any other machine capable of being excited by friction. As yet, therefore, they can only be said to bear a resemblance to the apparatus described in this paper. The effects hitherto known of this apparatus, and those which there is every reason to expect will be discovered hereafter, are likely, it is thought, to open a vast field for reflections and inquiries, not only curious but also interesting, particularly to the anatomist, the physiologist, and the physician.

Some Observations on the Head of the Ornithorhynchus paradoxus. *By* Everard Home, *Esq. F.R.S.* Read July 3, 1800. [*Phil. Trans.* 1800, p. 432.]

We learn from this communication that the beak of this singular animal, which on a cursory examination was thought to be exactly similar to that of the Duck, and calculated for the same purposes, is in fact materially different from it; and that, so far from being the mouth of the animal, as had been imagined, it is only a part added to the mouth, and projecting beyond it. This mouth has two grinding teeth on each side, both in the upper and lower jaw; they are without fangs, and may be considered as bony protuberances. Instead of incisor teeth, the nasal and palate bones are continued forwards, so as to support the upper portion of the beak; while the two under jaws are likewise continued forwards in the shape of two thin plates of bone, forming the central part of the under portion of the beak. The tongue is very short, and when extended can be projected into the bill scarcely one quarter of its length.

The organ of smell in this animal differs from that of quadrupeds in general, as well as of birds. The nostrils are nearly at the end of the beak, while the turbinated bones are situated in the skull, as in other quadrupeds; by which means there are two cavities the whole length of the beak superadded to this organ. The nerves which supply this organ are very large in proportion to the size of the animal.

Considering this curious structure of the nose in an animal which lives in water, it is natural to conclude that nature has fitted it for discovering its prey in that element, by means of the sense of smell; and that for this purpose it is enabled to introduce this prominence into the small recesses in which its natural food is probably concealed.

Experiments on the solar, and on the terrestrial Rays that occasion Heat; with a comparative View of the Laws to which Light and Heat, or rather the Rays which occasion them, are subject, in order to determine whether they are the same, or different. *By* William Herschel, *LL.D. F.R.S.* Part II. Read November 6, 1800. [*Phil. Trans.* 1800, p. 437.]

In the first part of this paper * the Doctor had proposed the seven following points which he meant to elucidate in this inquiry. 1. That heat, both solar and terrestrial, is a sensation occasioned by rays emanating from candent substances. 2. That these rays are subject to the laws of reflection. 3. That they are refrangible. 4. That they are of different refrangibility. 5. That they are liable to be detained in their passages through other bodies. 6. That they are also liable to be scattered on rough surfaces. And lastly, he proposed to ascertain whether in a certain degree of energy these rays may not have or acquire a power of illuminating objects. The three former points have been considered in the first, and the four last are the subjects of the present part of the paper.

Concerning the different refrangibility of the rays of heat, being the subject of the fourth article, we find that in refracting the rays of the sun by a prism, two distinct spectra may be said to be produced, the one of light, and the other of heat, the latter being distinctly observable by means of thermometers. These two spectra the Doctor has found means to represent by a figure, in which the length of the luminous or coloured spectrum, being represented by a line on which are raised ordinates proportionate to the quantity of illumination of each coloured ray, the curve joining these ordinates, together with this base line, inclose an area which may be said to represent the extent and intensity of the coloured rays. Adopting now another base line of the length of the range of the refracted rays of heat, one extremity of which is found to coincide with the termination of the coloured spectrum at the outward edge of the violet ray, and the other to project beyond the opposite termination at the red ray, which makes this line longer than the other, in the proportion of nearly $5\frac{1}{4}$ to 3. Ordinates are here in like manner applied according to the different degrees of intensity of heat indicated by accurate thermometers, and thus another area is produced, which represents the spectrum of heat both as to extent and intensity. On inspecting these figures, parts of which coincide, but other parts considerably deviate from each other, we find that the coloured and the heating rays differ widely, both in their mean refrangibility and

* Page 20.